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# *Antarctica: The world's last wilderness?*

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**Abstract:** The term 'wilderness' is explicitly mentioned in the Antarctic Treaty's Environmental Protocol, both in relation to protection of the wilderness values of Antarctica, and the consideration of these values when conducting any activity in the Treaty Area; yet no formal definition is provided. A definition is required to enable identification of potential wilderness areas in the Antarctic, to ensure their subsequent protection. That Antarctica contains wilderness seems in little doubt, but expansion and diversification of human activity creates impacts which are eroding and fragmenting the area of the continent that could be classified as wilderness. This paper reviews several possible definitions of wilderness previously submitted to the Antarctic Treaty Consultative Parties and used in wilderness protection elsewhere in the world, from the complex to the simple, and the inverse relationship between footprint and wilderness. Suggestions on ways to map, monitor and better protect wilderness into the future are investigated, using both the existing framework of the Treaty System, and other management tools such as Strategic Environmental Assessment and Landscape Character Assessment. Consideration and implementation of these recommendations should then safeguard Antarctica, so that it can continue to remain the world's last large contiguous wilderness.

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## Introduction

Antarctica is often thought of as a pristine wilderness, perhaps the world's last wilderness (Bastmeijer, Lamers, & Harcha, 2008; Tin, Hemmings, & Roura, 2008). Protection of the wilderness values of the Antarctic environment is explicitly mentioned in the 1991/'98 Protocol on Environmental Protection to the Antarctic Treaty (Antarctic Treaty Secretariat, 1991/'98), yet no formal definition of the term 'wilderness' is offered.

The argument exists and has arisen numerous times since the introduction of the Protocol that it is difficult, if not impossible, to protect something if you cannot first identify those values you wish to protect.

This paper seeks to critically review literature regarding the wilderness values of Antarctica (peer reviewed papers, the media and papers submitted to the Antarctic Treaty Consultative Meetings), highlight some definitions used elsewhere in relation to wilderness protection and apply these to the continent. The status of, and threats to, wilderness will be examined, before looking at methods for mapping and monitoring wilderness values, concluding with suggested ways forward for the Antarctic Treaty System (ATS) in relation to furthering their good intentions implied in the Protocol.

## Some definitions

It seems unquestionable that Antarctica is a wilderness, this vast, remote, frozen continent at the limit of human habitation, with very little evidence of human presence (Tin et al., 2008), but what does 'wilderness' mean? Various authors have sought to define wilderness in the context of Antarctica, and legal definitions exist in relation to wilderness areas elsewhere. This section will provide and critique some of these definitions.

Wilderness is not as easy to define as it may first appear; it can be a notoriously subjective term (Codling, 1998), open to interpretation in different ways by different people. One person's wilderness may offer an overwhelming sense of peace, solitude and contemplation, to others it may be a place of fear and foreboding. It can be both a place and an experience (Bastmeijer et al., 2008).

As Codling (1998) confers, wilderness designates land use; it does not describe the land itself. Keys (1999) describes wilderness values as intrinsic concepts, offering recreational and cultural experiences, embodying solitude and remoteness, a challenging sense of discovery in raw and unspoilt nature. Wilderness also has important existential value to people who may never get to experience it in person, but yet know that it is there.

Remoteness is a common theme amongst descriptors of wilderness, along with the absence of man-made structures, few or no people, infrequently or untraveled terrain and the shunning of motorised transport (Keys, 1999), an area that offers outstanding opportunities for solitude (Cole, 2005).

In 1998, the first meeting of the Committee for Environmental Protection (CEP) emphasised the importance of identifying areas of Antarctica that should be *"kept inviolate of human interference"* (CEP I (49)(iii)(a), 1998). One year after the protocol entered into force, Keys (1999) offered a detailed working definition of an Antarctic wilderness area as a:

*"Large area of unmodified land [not completely ice-covered] with or without adjacent sea retaining its natural character and influence, at least [200km] from permanent or semi-permanent habitation and major logistic transport routes, which is protected and managed so as to preserve its natural condition as an Antarctic wilderness"*(Keys, 1999 : 9).

This definition was subsequently refined by Codling (2001) to include primarily visible impacts, with additional consideration to the extent of associated noise and access routes, i.e. the region beyond which you are unaware of any human presence:

*"Any part of the Antarctic in which neither permanent habitation nor any other permanent evidence of present or past human presence is visible"* (Codling, 2001 : 337).

This 'viewshed' model is also favoured by Summerson, who suggests most human disturbance in the Antarctic is reduced to low level impact within 20km from its source (New Zealand, 2013a).

New Zealand offered an even simpler definition of wilderness as *"the absence of footprint"*. Footprint is a concept which, in comparison to wilderness, is relatively well accepted by the CEP and the ATS in general, as being a measure of the spatial extent of disturbance (New Zealand, 2011). This simple definition may well be the best way to define Antarctic wilderness, although some players would prefer a more positive definition of what wilderness actually is, rather than what it is not (ASOC, 2014).

Certain Parties including Australia and New Zealand already have domestic legislation relating to Subantarctic wilderness areas through the World Heritage listing of their Subantarctic islands (Keys, 1999). Other Parties, such as the United States, have domestic legislation in place in order to protect and manage wilderness regions in the Arctic. The Arctic National Wildlife Refuge was the impetus for adoption of the first Wilderness Act of the United States in 1964 (Yarnold, 2014), in which wilderness is defined as having four qualities – being untrammelled, natural, undeveloped and offering outstanding opportunities for solitude or a primitive and unconfined type of recreation (Landres et al., 2005).

## The Protocol

The Protocol on Environmental Protection to the Antarctic Treaty, otherwise known as the Madrid Protocol, or simply the Protocol, was signed in 1991 and ratified in 1998. It arose out of concerns for the protection of the Antarctic environment raised during drafting of the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) in the

1980s. Article 2 of the Protocol designates Antarctica as *"a natural reserve, devoted to peace and science"* (Antarctic Treaty Secretariat, 1991/'98).

Wilderness is explicitly mentioned in both the Environmental Principles of the Protocol:

> *"... protection of the Antarctic environment ... and the intrinsic value of Antarctica, including its wilderness and aesthetic values..."* (Art. 3.1), and
>
> *"activities in the Antarctic Treaty area shall be planned and conducted so as to avoid degradation of ... areas of ... wilderness significance"* (Art. 3.2(b)(vi)),

and also in Annex V to the Protocol, under Article 3 - Antarctic Specially Protected Areas, by stipulating that Parties to the Treaty

> *"... shall seek to identify ... and to include in the series of Antarctic Specially Protected Areas:*
>
> *(a) areas kept inviolate from human interference*
>
> *(g) areas of outstanding aesthetic and wilderness value"* (Annex V, Art. 3.2) (Antarctic Treaty Secretariat, 1991/2002).

No formal definitions are given of the term wilderness or wilderness value (Tin et al., 2008), and to date, 16 years after the Protocol entered into force, only one Antarctic Specially Protected Area (ASPA) has been designated on the basis of its aesthetic and [or] wilderness characteristics[1] (Australia, 2012). Many other ASPAs may not be large enough in order to retrospectively do so (Keys, 1999).

## Threats to wilderness in Antarctica

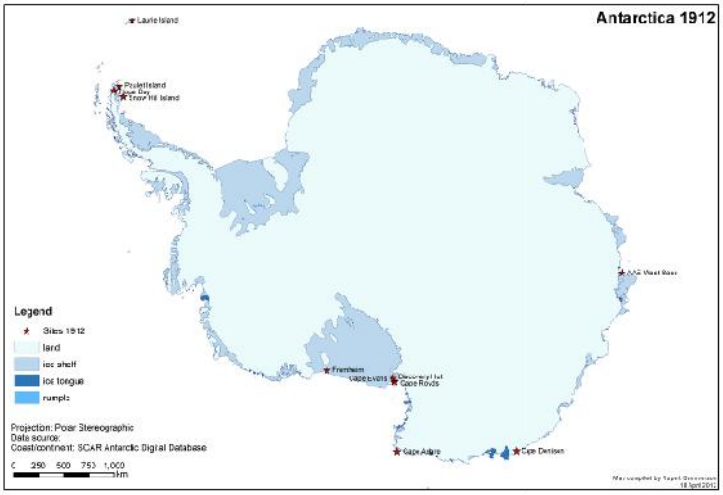
Despite the vast size and hostile nature of the Antarctic, its wilderness is not inviolable (Tin et al., 2008). The main threats to wilderness and the wilderness values of Antarctica are through human impacts and the ever expanding presence of man on the continent. Human activity is increasing and diversifying, both in governmental science and non-governmental tourism and commercial realms (plus their associated logistical support). All these activities leave a footprint, and footprint has an inverse relationship with wilderness (New Zealand, 2011).

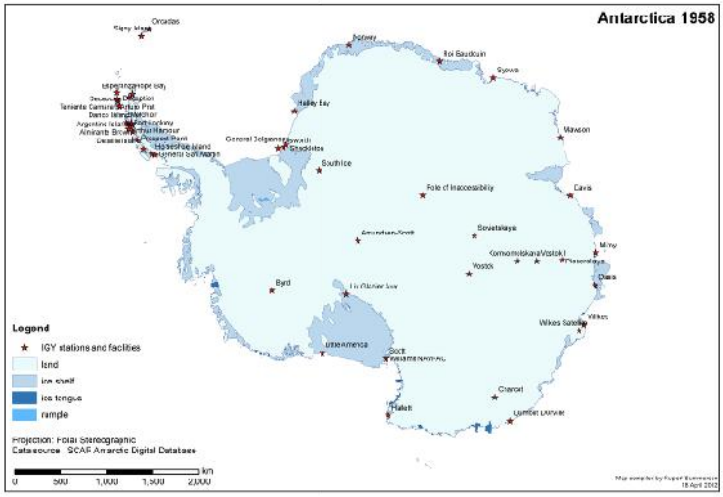
New permanent or semi-permanent infrastructure to support human habitation, increasing accessibility for deep field research and adventure tourism, remotely automated equipment and impacts from afar such as climate change and pollution all impact on Antarctica as it exists today, and serve to erode and fragment what is the world's largest contiguous wilderness (Tin et al., 2008).

[1]ASPA 123 - Barwick and Balham Valleys, Southern Victoria Land (ASPA 129 - Rothera Point, Adelaide Island and ASPA 165 - Edmonson Point, Wood Bay, Ross Sea have been designated as areas kept inviolate from human interference so that future comparisons may be possible with localities that have been affected by human activities) (Australia, 2012).

In an Information Paper submitted to ACTM XXVIII in 2004, the Antarctic and Southern Ocean Coalition (ASOC) summarised 17 significant infrastructure projects that were planned, or already underway, that would enhance access to remote regions of, and have more than a minor or transitory impact on, the environment in parts of Antarctica that were essentially virgin or pristine, changing them irreversibly (ASOC, 2004). Projects such as these have significant cumulative impacts both on the environment and on Antarctica's intrinsic values, and result in the vast (yet ultimately finite) wilderness being progressively encroached upon.

Working Paper 50 submitted to ATCM XXXV by New Zealand and the Netherlands included maps (Figure 1) that detail the increase and intensification of huts, bases and other fixed infrastructure of human activity from 1912, 1958 and 2012 (New Zealand & Netherlands, 2012). These highlight the fragmentation and erosion of space on the continent that could be potentially classified or protected as wilderness.



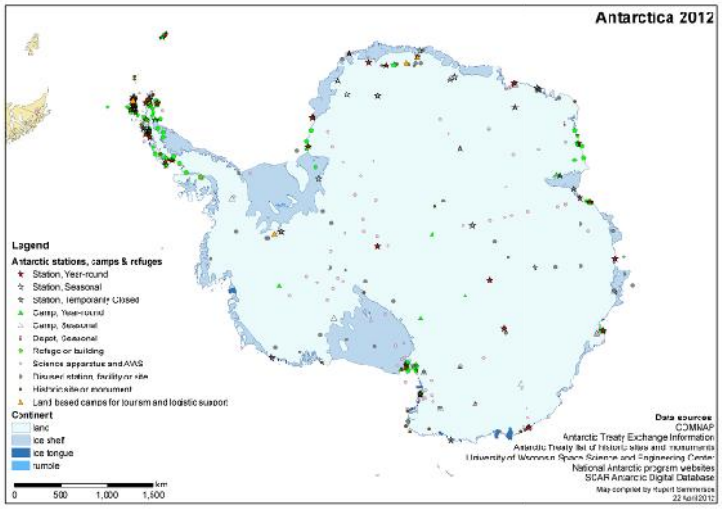



Figure 1: Infrastructure of human activity in 1912, 1958 and 2012, showing the increase over the past 100 years (New Zealand & Netherlands, 2012).

Tourists have also visited over 300 sites since records began, and regularly 100-200 sites are visited each season (Tin et al., 2008). This in effect, may serve to destroy the very wilderness values that many tourists to Antarctica are hoping to experience.

Cole (2005) highlights further benefits of wilderness protection in relation to ecology. With a minimisation of anthropogenic influence, ecological processes continue with '*free play'* and the risk of introduction of invasive species is minimised, both important attributes in Antarctic science.

## Mapping the current status of Antarctic wilderness

The size of Antarctica is vast in relation to the area [presently] impacted by human activity. Human impacts are mainly confined to zones within 200km of permanent scientific bases, and areas of 100km from the main transport routes by land or air (Figure 2). Excluding these zones of non-wilderness leaves approximately 80-85% of '*terrestrial*' Antarctica according to Keys (1999); three quarters of this is ice sheet or ice shelf, which leaves 25% or 2million km$^2$ of potentially high value wilderness.

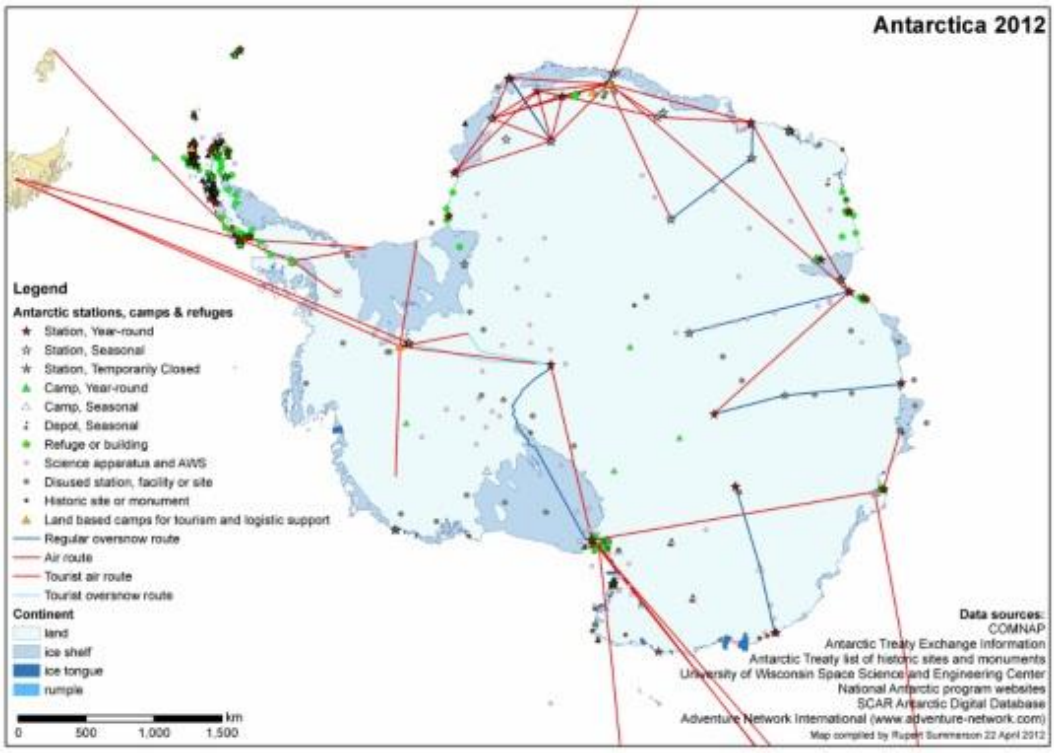



Figure 2: Fixed infrastructure of human activity in 2012, with some logistic support routes overlain (After New Zealand & Netherlands, 2012).

Most activity is concentrated in ice-free and/or coastal areas where human impacts can be long lasting and cumulative (Keys, 1999). Countering this aspect of development patterns of

Antarctic infrastructure is a study by Summerson & Bishop who found that coastal and ice-free environments are valued less than mountainous or ice-covered terrains in terms of both their aesthetic and wilderness character (Summerson & Bishop, 2012).

## Options for wilderness management

Although the Protocol gives general protection to the Antarctic environment and makes provision for wilderness protection through the ASPA system, it as yet, does not reserve a significant area of what could be identified as wilderness [if a formal definition was to be accepted].

The most recent CEP five-year work plan lists as priorities two elements relating to wilderness protection:

*"1. Develop an agreed understanding of the terms "footprint" and "wilderness".*

*2. Develop methods for improved protection of wilderness under Annexes I and V"*
(ASOC, 2014 : 2).

If the Antarctic Treaty System (ATS) was to adopt a formal definition of wilderness, it, along with the CEP, could then identify suitable areas for protection and management and implement Antarctic Specially Managed Areas (ASMAs) with smaller ASPAs nested within them (Keys, 1999). These are tools already well established within the Treaty framework. The size of an ASPA for the purposes of wilderness protection needs to be large in order to protect the inherent wilderness values and minimise any impacts from external to its boundaries (Keys, 1999).

More emphasis on attention to the potential human footprint (a direct and measurable output) and impact on wilderness values in the conduct of Environmental Impact Assessments (EIA) under Annex I to the Protocol is to be encouraged, with impacts on wilderness to be taken into account in the planning and conduct of all activities in the Antarctic Treaty area (New Zealand, 2013b). Additional tools such as Strategic Environmental Assessment (Kriwoken & Rootes, 2000; New Zealand, 2013a) should be utilised to proactively integrate the consideration of environmental outcomes at a policy-making level. A greater push for higher level EIA through Comprehensive Environmental Evaluations (CEE) is also a valid argument (New Zealand, 2013a). CEE factors in the initial and predicted future environmental reference states, along with estimations of attributes such as the extent, duration, intensity, frequency and reversibility of an activity prior to its approval, as well as consideration of its cumulative impacts. CEE also necessitates incorporation of environmental monitoring programs (Kriwoken & Rootes, 2000).

Codling (2001) postulates, that designation of protected areas with wilderness value, within a systematic framework (as required under Article 3(2) of Annex V of the Protocol), could be achieved through the use of planning tools such as Landscape Character Assessment (LCA).

LCA is used to help assess the subjective nature of wilderness, by describing the main physical features and other landscape attributes such as its enclosure and scale then combining these characters to give an overall objective measure.

Cole (2007) emphasises that baseline data is important in order to effectively manage and safeguard wilderness. He quotes an argument by Aldo Leopold from 1941 who described wilderness as *"a base-datum of normality, a picture of how healthy land maintains itself"* (Cole, 2007 : 30).

Acknowledging that any human activity in Antarctica has an impact, methods such as the Limits of Acceptable Change model (Davis, 1999) can be used to identify and monitor any negative impacts in order to minimise, or mitigate, these at a range of scales, from local to regional to continent-wide (ASOC, 2014), and keep them from exceeding a pre-determined level.

In addition to more thorough planning and monitoring, increased utilisation of remote sensing platforms and numerical modelling techniques can help to limit the footprint related to science and logistics. ASOC also calls for greater information sharing in the Antarctic Environments Portal, and to draw more on information from the northern polar wilderness areas (ASOC, 2014). This is to be a focus of CEP XVIII in 2015.

Utilising tools such as these within an integrated framework for wilderness protection, should help to fulfil the objectives of wilderness management outlined by Keys (1999) - to maintain the natural attributes and character of an area, ensure its survival for future generations to experience, yet to still enable compelling scientific research to be conducted there.

## Conclusion

Is Antarctica the world's last wilderness? By any definition, Yes; but the present pattern of expansion and diversification of human activity is threatening to erode and fragment the vast, contiguous wilderness that is found there, not only decreasing its effective area but also its quality. Human impacts in the Antarctic are long lasting, cumulative in nature and difficult to remediate.

Tools exist, both within, and outside of the current Antarctic Treaty framework to better define, identify, map and monitor the wilderness values intrinsically present in Antarctica, and to allow for better regulation of human activity on the continent to minimise further encroachment upon them.

As recommended in the Antarctic Resolution at the 10th World Wilderness Congress (Tin, 2014), progress on wilderness protection is crucial to maintain the integrity of the Protocol's objectives, and to limit adverse impacts on the very values it aims to preserve. With the 25th anniversary of the signing of the Protocol approaching in 2016, it is time for the Antarctic

Treaty Consultative Parties to reaffirm their commitments to protect Antarctic wilderness and adopt not only a definition of wilderness, but actions to limit further expansion of the human footprint on this wild continent.

## References:


Antarctic Treaty Secretariat. (1991/2002). *Annex V*. Retrieved from http://ats.aq/documents/recatt/Att004_e.pdf.

Antarctic Treaty Secretariat. (1991/'98). *The Protocol on Enironmental Protection to the Antarctic Treaty*. Retrieved from http://ats.aq/documents/recatt/Att006_e.pdf.

ASOC. (2004). *IP74 Development Pressures on the Antarctic Wilderness*. Paper presented at the XXVIII Antarctic Treaty Consultative Meeting, Stockholm.

ASOC. (2014). *IP71 Managing Human Footprint, Protecting Wilderness: A Way Forward*. Paper presented at the XXXVII Antarctic Treaty Consultative Meeting, Brasilia.

Australia. (2012). *Analyses of the Antarctic protected areas system using spatial information, IP26*. Paper presented at the Antarctic Treaty Consultative Meeting XXXV, Hobart.

Bastmeijer, K., Lamers, M., & Harcha, J. (2008). Permanent Land-based Facilities for Tourism in Antarctica: The Need for Regulation. *Review of European Community & International Environmental Law, 17*(1), 84-99.

Codling, R. (1998). *IP2 Wilderness and Aesthetic Values in Antarctica*. Paper presented at the XXII Antarctic Treaty Consultative Meeting, Tromso.

Codling, R. (2001). Wilderness and aesthetic values in the Antarctic. *Polar Record, 37*(203), 337-352.

Cole, D. N. (2005). Symbolic Values. *International journal of wilderness, 11*(2), 23.

Cole, D. N. (2007). Scaling-up the minimum requirements analysis for big wilderness issues. *International journal of wilderness, 13*(1), 8-12.

Committee for Environmental Protection (CEP I). (1998). *Report of the CEP I May 25-29, 1999*, Tromso, Norway.

Davis, P. B. (1999). Beyond guidelines: A model for Antarctic tourism. *Annals of Tourism Research, 26*(3), 516-533.

Keys, H. (1999). *IP80 Towrds additional protection of Antarctic Wilderness Areas*. Paper presented at the XXIII Antarctic Treaty Consultative Meeting, Lima.

Kriwoken, L. K., & Rootes, D. (2000). Tourism on ice: environmental impact assessment of Antarctic tourism. *Impact Assessment and Project Appraisal, 18*(2), 138-150.

Landres, P. B., Boutcher, S., Merigliano, L., Barns, C., Davis, D., Hall, T., . . . Laker, M. (2005). *Monitoring selected conditions related to wilderness character: a national framework* (Vol. 151): United States Department of Agriculture, Forest Service, Rocky Mountain Research Station.

New Zealand. (2011). *WP35 Understanding concepts of Footprint and Wilderness related to protection of the Antarctic Environment*. Paper presented at the XXXIV Antarctic Treaty Consultative Meeting, Buenos Aires.

New Zealand. (2013a). *IP39 Intersessional report on the provision of guidance material to assist Parties to take account of wilderness values when undertaking environmental impact assessments*. Paper presented at the XXXVI Antarctic Treaty Consultative Meeting, Brussels.

New Zealand. (2013b). *WP35 Possible guidance material to assist Parties to take account of wilderness values when undertaking environmental impact assessments*. Paper presented at the XXXVI Antarctic Treaty Consultative Meeting, Brussels.

New Zealand, & Netherlands. (2012). *WP50 Concepts for Wilderness protection in Antarctica using tools in the Protocol*. Paper presented at the XXXV Antarctic Treaty Consultative Meeting, Hobart.

Summerson, R., & Bishop, I. D. (2012). The impact of human activities on wilderness and aesthetic values in Antarctica. *Polar Research, 31*(0). doi: 10.3402/polar.v31i0.10858

Tin, T. (2014). *Wild 10 Antarctic Resolution #26: The Antarctic Treaty Area as a Contiguous Wilderness Area*. Paper presented at the XXXVII Antarctic Treaty Consultative Meeting, Brasilia.

Tin, T., Hemmings, A. D., & Roura, R. (2008). Pressures on the wilderness values of the Antarctic continent. *International journal of wilderness, 14*(3), 7-12.

Yarnold, D. (2014). Keeping Our Arctic Wilderness Wild. *The Huffington Post.* Retrieved 26 November, 2014, from http://www.huffingtonpost.com/david-yarnold/keeping-our-arctic-wilder_b_5758720.html